FINAL

PRELIMINARY ASSESSMENT
NARRATIVE REPORT
SITE INSPECTION FORMS AND PASCORE

SITES 1, 2 AND 3
NAVAL AMMUNITION FACILITY
VIEQUES ISLAND

U.S. NAVAL STATION
ROOSEVELT ROADS, PUERTO RICO

CONTRACT TASK ORDER 0007

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
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INTRODUCTION

INTRODUCTION

Naval Station, Roosevelt Roads has prepared Preliminary Assessment/Site Investigation report forms for use in the Hazard Rank System by the United States Environmental Protection Agency (US-EPA), Region II for the Naval Communication Facility on Vieques Island (NAF-V). The intent of this work is to complete a review of existing information, and, using these data, complete the SI report forms and PAscore.

The U.S. Naval Station, Roosevelt Roads, located on the eastern tip of Puerto Rico, consists of 30,800 acres of land including 22,600 acres on Vieques Island. Operations on Vieques Island began in 1943 and include military training, ammunition storage and general support for military exercises. Naval property on Vieques Island consists of the NAF-V operation on the western end of the island, and both Camp Garcia and the military training grounds on the eastern end. Materials disposed of at sites in NAF-V include paints, solvents, waste mixed amine fuel, and inhibited red fuming nitric acid.

Hazardous materials from the main base that were deposited on the soil surface at NAF-V included paint and solvents at the Quebrada Disposal Area and the Mangrove Disposal Area. Inhibited red fuming nitric acid (IRFNA) and mixed amine fuel (MAF-4) were deposited at the IRFNA/MAF-4 Disposal Area.

The West Indian Whistling Duck (Dendrocygna arborea), which is located in the study area, is a Commonwealth listed threatened species and is a candidate for listing on the Federal threatened and endangered species list. The Commonwealth and Federally listed endangered West Indian Manatee (Trichechus manatus) breeds in ocean waters adjacent to the Mangrove Site. The endangered Hawksbill Turtle (Eretmochelys imbricata) and Leatherback Turtle (Dermochelis coracea) have been observed in Vieques Passage along with the threatened Green Sea Turtle (Chelonia mydas).

Ocean water is used for recreational swimming and harvesting of seafood. Surface water bodies are not used for drinking water. Groundwater on the west end of Vieques is used to water livestock. There are no perennial streams on Vieques. The U.S. Navy has an NPDES permit for the release of ordnance from the mainland of Puerto Rico into the waters of the Caribbean Sea at the eastern end of the island.

The information provided by the available reports, along with a comprehensive target survey, and an offsite reconnaissance is adequate with respect to the hazardous waste quantities and locations onsite. It has been determined that groundwater is not utilized for potable purposes within 4 miles of the site and that there are no surface water intakes within 4 miles downstream of the facility. Because the hazardous wastes have been disposed of in a sensitive

environment and near a fishery, there is a potential threat of contaminant migration to Federally and Commonwealth listed endangered and threatened species, and contamination of the food chain leading to human consumption.

PRELIMINARY ASSESSMENT NARRATIVE REPORT

PRELIMINARY ASSESSMENT NARRATIVE REPORT

DATE: August 4, 1992

PREPARED BY: Baker Environmental Inc.
Navy CLEAN

SITE: Naval Ammunition Facility
Vieques, Puerto Rico

EPA ID NO.: PR3170090002

1.0 INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), Baker conducted a Preliminary Assessment (PA) at the Naval Ammunition Facility (NAF-V), Vieques, Puerto Rico. The purpose of this investigation was to collect information concerning conditions at the NAF-V sufficient to assess the threat posed to human health and the environment, and to determine the need for additional CERCLA/SARA or other appropriate action. The scope of the investigation included review of available information, a comprehensive target survey, and an onsite reconnaissance.

2.0 SITE DESCRIPTION, OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

2.1 Location

The Naval Ammunition Facility is located on Vieques Island, Puerto Rico. The geographic coordinates of the three sites of concern are as follows:

Site 1-Quebrada Disposal Site	18°07'15"N	65°32'30"W
Site 2-Mangrove Disposal Site	18°07'15"N	65°33'45"W
Site 3-IRFNA/MAF-4 Disposal Site	18°06'00"N	65°32'30"W

2.2 Site Description/Operational History

The U.S. Naval Station, Roosevelt Roads, located on the eastern tip of Puerto Rico, consists of 30,800 acres of land including 22,600 acres on Vieques Island. Operations on Vieques Island began in 1943 and include military training, ammunition storage and general support for military exercises. Naval property on Vieques Island consists of the NAF-V operation on the western end, and both Camp Garcia and the military training grounds on the eastern end.

There are three sites of concern: Site 1-Quebrada Disposal Site encompasses an area of approximately 5 acres. The landfill site was used between the early 1960s and the late 1970s. Site 2-Mangrove Disposal Site is located in an 18-acre, oceanside, mangrove swamp in Laguna Arenas along North Shore Road (Route 70). This disposal site was in use during the 1960s and 1970s and was used as a base disposal area. Site 3-IRFNA/MAF-4 Disposal Site is located below Building 422. Available information indicates that disposal occurred in 1975.

2.3 Waste Characteristics

It is estimated that there are over 1,500 cubic yards of material present at Site 1. The Initial Assessment Study (IAS) made the assumption that no more than one percent of the material is hazardous, based on the low level of industrial-type activity at NAF-V. It was figured that approximately 12,000 pounds (or six tons) of hazardous materials may have been disposed of at this site. The suspected hazardous substances include solvents (xylene, methyl ethyl ketone, and toluene) and paint cans. The paints contained a lead base.

An estimation of 800 cubic yards of materials were disposed of at Site 2. It was estimated that as much as eight cubic yards of material weighing 6,400 pounds could be considered potentially hazardous. The suspected hazardous substances are the same as listed in Site 1.

Site 3 is located in an area where AQM-37A target drones were found to be leaking fuel. It was estimated that a maximum total of 1,775 pounds of mixed amine fuel (MAF-4) and 5,275 pounds of inhibited red fuming nitric acid (IRFNA) were emptied into the quebrada (Site 3). The exact composition of MAF-4 fuel is confidential, and cannot be released to the public. However, the fuel is similar to hydrazine in composition. Hydrazine compounds are strong reducing agents and are very reactive. IRFNA is 86 percent nitric acid, 6 to 15 percent nitrogen dioxide, and less than 5 percent water.

3.0 GROUNDWATER PATHWAY

3.1 Hydrogeologic Setting

The NAF-V sites are located on the Island of Vieques which is characterized by volcanic rocks generally overlain by alluvial deposits and patches of limestone. The principal aquifers, which normally have an insufficient capacity for domestic, municipal or industrial use, lie in the sandy, alluvial deposits in the two major valleys, Esperanza Valley on the east end of the island and Resolution Valley, in the vicinity of NAF-V.

The aquifer of concern is found in alluvial gravel and sand deposits that generally are more than 40 feet thick. The larger valleys, such as Resolution Valley, extend from Laguna Kiani at the Mangrove Disposal Site southeastward toward Laguna Playa Grande, and provide the largest quantities of water. The IRFNA/MAF-4 and Quebrada Disposal Sites are located on alluvium of the Resolution Valley. Soils in the unsaturated zone have been formed by the weathering of the underlying granodiorite intrusive. The soils are primarily coarse-grained, arkosic (sandstone containing unweathered feldspar) material with varying amounts of clay.

The soils are represented by sandy clay, coarse sand and sandstone materials with small amounts of clay and a permeability value of 10^{-3} to 10^{-5} cm/sec. Groundwater in Resolution Valley flows generally to the northwest. The water table ranges from 7 to 17 feet under the western half of Vieques. However, in the vicinity of the Mangrove Disposal Site, the water table is at or near ground surface in the surrounding marshland.

3.2 Groundwater Targets

The population within a 4-mile radius relies on the Puerto Rico Aqueduct and Sewer Authority pipeline that supplies freshwater from Puerto Rico. They are not dependent on the groundwater for use as drinking water. Also, there are no registered wells within the 4-mile radius. The nearest resident with a registered well is approximately 4.6 miles from the sites.

3.3 Groundwater Conclusions

The Quebrada Disposal Site is located on the side of a steep ravine with no liner or run-off control, and wastes were disposed of in uncovered piles. The Mangrove Disposal Site occupies a mangrove swamp

with no liner and no tidal protection, and wastes were deposited in uncovered piles and burned. The IRFNA/MAF-4 Disposal Site is located in a quebrada with no liner and wastes were spilled onto the ground surface. Given these conditions, a suspected release to groundwater is evident.

4.0 SURFACE WATER PATHWAY

4.1 Hydrologic Setting

Vieques Passage is the nearest downslope surface water for Sites 1 and 3. The distance the runoff from Site 1 would be expected to follow is approximately 2,500 feet, where the distance the runoff from Site 3 would be expected to follow is approximately 9,000 feet.

For Site 2, the nearest downslope surface water is Laguna El Pobre. The Mangrove Disposal Site is located partially in Laguna El Pobre; therefore, there is virtually no significant separation from surface water.

4.2 Surface Water Targets

There are no drinking water intakes located within 15 downstream miles of the site. Residents receive water from a pipeline that supplies freshwater from Puerto Rico.

Laguna Kiani, Laguna El Pobre and the Vieques Passage are recognized as fisheries within 15 miles downstream of the point of surface water entry.

Sensitive environments within 15 miles downstream of the point of surface water entry include habitats known to be used by Federally designated or proposed endangered or threatened species, habitats known to be used by State designated endangered or threatened species, and wetlands.

4.3 Surface Water Conclusions

There is a potential for a release of contaminants as the Mangrove Disposal Site is located in a marsh area. Wastes at the site were apparently piled up, burned, and then bulldozed into the mangrove area. The site is known to contain solvents and paint cans among other materials.

Also, it should be noted that Site 3 is near to the probable surface recharge area for a permanent, naturally occurring spring. The spring is currently used by the Cooperative de Cos Ganaderos and is

frequently used by cattle, horses, and various birds and other wildlife. However, it is located 2,000 feet downgradient of the drainage divide separating the spring's groundwater system from the groundwater system where fuel materials were disposed.

In addition, a spring/bog is located directly downhill from Site 3, Building 422, and is, therefore, in the same water -basin as the disposal area.

5.0 SOIL EXPOSURE AND AIR PATHWAYS

5.1 Soil and Air Targets

There are no residences, schools, day-care facilities, or workers on or within 200 feet of the NAF-V sites. However, there are rare and endangered plants in the vicinity of the sites. Also, there are habitats known to be used by Federally designated or proposed endangered or threatened species, habitats known to be used by State designated endangered or threatened species, and wetlands.

5.2 Soil Exposure and Air Pathway Conclusions

The soil and air exposure pathways appear to pose a minimal threat at NAF-V.

6.0 SUMMARY AND CONCLUSIONS

The information provided by the available reports, along with a comprehensive target survey, and an onsite reconnaissance is adequate with respect to the hazardous waste quantities and locations onsite. It has been determined that groundwater is not utilized for potable purposes within 4 miles of the site and that there are no surface water intakes within 4 miles downstream of the facility. However, because the hazardous wastes have been disposed of in a sensitive environment and near a fishery, there is a potential threat of contaminant migration to Federally and Commonwealth listed endangered and threatened species and contamination of the food chain leading to human consumption.

SITE INSPECTION REPORT

SITE SUMMARY

SITE ASSESSMENT REPORT: SITE INSPECTION

PART I: SITE INFORMATION

1. **Site Name/Alias:** Naval Ammunition Facility (NAF-V)
   Street: Unknown
   City: Vieques **State:** Puerto Rico **ZIP:** 000765
2. **County:** Vieques **County Code:** 147 **Cong. Dist.:** N/A

3. **EPA ID No.:** PR3170090002

4. **Block No.:** Unknown **Lot No.** Unknown

5. **USGS Quadrangle.:** Isla De Vieques

Coordinates of Areas of Concern:

	Latitude	Longitude
Site 1-Quebrada Disposal Site	18°07'15" N	65°32'30" W
Site 2-Mangrove Disposal Site	18°07'15" N	65°33'45" W
Site 3-IRFNA/MAF-4 Disposal Site	18°06'00" N	65°32'30" W

6. **Owner:** U.S. Navy **Tel. No.:** N/A
   Street: N/A
   City: N/A **State:** N/A **ZIP:** N/A

7. **Operator:** Roosevelt Roads Naval Station
   Street: Roosevelt Roads
   City: Ceiba **State:** Puerto Rico **Zip:** 34051

8. Type of Ownership:

☐ Private ☒ Federal ☐ State
☐ County ☐ Municipal ☐ Unknown ☐ Other

9. Owner/Operator Notification on File:

☐ RCRA 3001 Date _____ ☐ CERCLA Date _____
☐ None ☒ Unknown

10. Permit Information:

Permit No.	Permit Date	Date Issues	Expiration	Comments
NPDES	PRG990001	9/24/84	Unknown	Release of ordnance into water

11. Site Status:

☐ Active ☒ Inactive ☐ Unknown

12. Years of Operation: 1943 to 1978

13. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) **Waste Sources**

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	Landfill	~~Site~~ 1-Quebrada Disposal Site
2	Landfill	Site 2-Mangrove Disposal Site
3	Landfill - Spill Area	Site 3-IRFNA/MAF-4 Disposal Site

(b) **Other Areas of Concern**

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

The Quebrada Disposal Site, Mangrove Disposal Site, and the IRFNA/MAF-4 Disposal Site were the only three sites that were identified in the Confirmation Study. Since the criteria for listing these sites as potential hazards to human health or to the environment is based on the existence of sufficient evidence to indicate the presence of contamination, it is assumed that these are the only sites where known incidents of miscellaneous spills or dumping occurred on site.

14. Information available from:

Contact: James Szykman **Agency:** NAVFACENGCOM LANTDIV
Tel. No.: 804/445-2993
Preparer: Susan Johnston **Agency:** Baker Environmental, Inc. **Date:** August 3, 1992

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 **Site 1- Quebrada Disposal Site**

Source Type:

☒	Landfill	☐	Contaminated Soil
☐	Surface impoundment	☐	Pile
☐	Drums	☐	Land Treatment
☐	Tanks/Containers	☐	Other

Description:

The Quebrada Disposal Site is part of Roosevelt Roads Naval Station Operations and is a Federal facility. Permits pertaining to this site were not found on file. The site encompasses an area of approximately 5 acres. The landfill site was used between the early 1960s and the late 1970s.

Ref. No. 1 and 2

Hazardous Waste Quantity:

The quebrada varies from 20 to 30 feet wide and 10 to 20 feet deep. It is estimated that there are over 1,500 cubic yards (500 feet x 20 feet x 4 feet) of material present at the site. The Initial Assessment Study (IAS) made the assumption that no more than one percent of the material is hazardous, based on the low level of industrial-type activity at NAF-V. One percent of 1,500 cubic yards is 15 cubic yard; using the figure of roughly 800 pounds per cubic yard for municipal garbage, approximately 12,000 pounds or six tons of hazardous material may have been disposed of at this site.

Ref. No. 2

Hazardous Substances/Physical State:

The IAS report has indicated that the site contains buried and exposed, (apparently) empty 55-gallon drums, ordnance carriers (2.75-inch rocket launchers), POL, solvent and paint cans, rubble, fluorescent light fixtures, and cars as well as all types of base trash including glass, metal, tires, wood, etc.

The suspected hazardous substances include the solvents and paint cans among other materials. Solvents used at the base included xylene, methyl ethyl ketone, and toluene. The paints contained a lead base.

The physical states of the wastes are sludges, liquids and solids.

Ref. No. 1 and 2

Waste Unit 2 **Site 2- Mangrove Disposal Site**

Source Type:

☒	Landfill	☐	Contaminated Soil
☐	Surface impoundment	☐	Pile
☐	Drums	☐	Land Treatment
☐	Tanks/Containers	☐	Other

Description:

The Mangrove Disposal Site is part of Roosevelt Roads Naval Station Operations and is a Federal facility. It is located in an 18-acre oceanside mangrove swamp in Laguna Arenas along North Shore Road (Route 70) on the NAF-V. There is no known history of permits pertaining to this site. The disposal site was in use during the 1960s and 1970s, and was used as a base disposal area.

Ref. No. 1 and 2

Hazardous Waste Quantity:

The waste materials extend northeast from the Laguna Kiani Bridge approximately 300 feet, and into the mangrove swamp for about 100 to 120 feet in a northerly direction and about 10 feet in a southerly direction from North Shore Road. The IAS team estimated that there are 800 cubic yards (100 feet x 75 feet x 3 feet) of materials at the site. It was estimated that as much as eight cubic yards of material weighing 6,400 pounds could be considered potentially hazardous.

Ref. No. 2

Hazardous Substances/Physical State:

The IAS report has indicated that the site contains all types of base trash (glass, metal, wood, etc.), POL, solvent and paint cans, and rubble.

The suspected hazardous substances include the solvents and paint cans among other materials. Solvents used at the base included xylene, methyl ethyl ketone and toluene. The paints contained a lead base.

The physical states of the wastes are sludges, liquids and solids.

Ref. No. 1 and 2

Waste Unit 3 **Site 3-IRFNA/MAF-4 Disposal Site**

Source Type:

☐	Landfill	☐	Contaminated Soil
☐	Surface impoundment	☐	Pile
☐	Drums	☐	Land Treatment
☐	Tanks/Containers	☒	Other - Spill Area

Description:

The inhibited red fuming nitric acid/mixed amine fuel (IRFNA/MAF-4) disposal area is part of Roosevelt Roads Naval Station Operations and is a Federal facility. The site is located below Building 422 on the NAF-V. Available information indicates that disposal practice occurred in 1975.

Ref. No. 1 and 2

Hazardous Waste Quantity:

Twenty-five AQM-37As were disposed of on and near the island of Vieques. The AQM-37A is a target drone capable of supersonic speeds. The 25 drones were found to be leaking fuel, consisting of 71 pounds of mixed amine fuel (MAF-4) and 211 pounds of inhibited red fuming nitric acid (IRFNA) per drone. A maximum total of 1,775 pounds of MAF-4 and 5,275 pounds of IRFNA were emptied into the quebrada, and the drone bodies were disposed of by dropping them into the ocean off a deep water ledge.

Ref. No. 2

Hazardous Substances/Physical State:

The hazardous substances reported to be present are inhibited red fuming nitric acid and mixed amine fuel.

The physical state of the waste type of concern is liquid.

Ref. No. 1 and 2

PART III: SAMPLING RESULTS

EXISTING ANALYTICAL DATA
SITE INSPECTION RESULTS

In April, 1988, Environmental Science and Engineering, Inc., prepared a Confirmation Study to determine possible dispersion and migration of specific chemicals at Roosevelt Roads and NAF-V, Vieques for the Atlantic Division, Naval Facilities Engineering Command.

The objective of this Confirmation Study was to determine if specific toxic or hazardous materials have contaminated the environment as a result of Navy activities.

The results of this study have demonstrated that at Site 1, no elevated levels of any of the constituents of concern were detected in the soil and sediment sampling. The groundwater data collected from the three monitoring wells showed that metals concentrations exceeded drinking water criteria and ambient water quality criteria. It is assumed that the groundwater data was analyzed for total (unfiltered) metals. However, this information was not apparent in the report.

At Site 2, no elevated levels of any of the constituents were detected in the soil. However, chromium and lead were found in the sediment samples. It should be noted that the levels were not significant when compared to background element concentrations found in soils. In surface water, total lead and chromium were elevated, but the levels were within the ambient water quality criteria, as well as drinking water criteria.

Only groundwater was collected for analysis at Site 3. Total zinc was the only constituent detected in the groundwater. The detected level was within the National Secondary Drinking Water Standard.

Ref. No. 8

PART IV: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.**

The Quebrada Disposal Site is located on the side of a quebrada (an intermittent drainage area) with no liner or run-off control; wastes were disposed of in uncovered piles. The Mangrove Disposal Site occupies a mangrove swamp with no liner and no tidal protection; wastes were deposited in uncovered piles and burned. The IRFNA/MAF-4 Disposal Site is located in a quebrada with no liner; wastes were spilled onto the ground surface.

Ref. No. 1

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections,dicontinuities, depth to water table, groundwater flow direction.**

The NAF-V sites are located on the Island of Vieques which is characterized by volcanic rocks generally overlain by alluvial deposits and patches of limestone. The principal aquifers lie in the sandy, alluvial deposits in the two major valleys, Esperanza Valley on the east end of the island and Resolucion Valley, in the vicinity of NAF-V.

The aquifer of concern is found in alluvial gravel and sand deposits that generally are more than 40 feet thick. The larger valleys, such as Resolucion Valley, extend from Laguna Kiani at the Mangrove Disposal Site southeastward toward Laguna Playa Grande, and provide the largest quantities of water. The IRFNA/MAF-4 and Quebrada Disposal Sites are located on alluvium of the Resolucion Valley. Soils in the unsaturated zone have been formed by the weathering of the underlying granodiorite intrusive. They are primarily coarse-grained, arkosic (sandstone containing unweathered feldspar) material with varying amounts of clay.

The soils are represented by sandy clay, coarse sand and sandstone materials with small amounts of clay and a permeability value of 10^{-3} to 10^{-5} cm/sec. Groundwater in Resolution Valley flows generally to the northwest. The water table ranges from 7 to 17 feet under the western half of Vieques. However, in the vicinity of the Mangrove Disposal Site, the water table is at or near ground surface due to the surrounding marshland.

Ref. No. 1

3. Is a designated well head protection area within 4 miles of the site?

There are no designated well head protection areas located within 4 miles of the site.

Ref. No. 9

4. What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?

The depth to the highest level of the saturated zone varies from approximately 7 to 17 feet underlying the western half of Vieques. However, the water level at the Mangrove Disposal Site is at the ground surface in the marsh area. Therefore, it is assumed that the highest seasonal level of the saturated zone of the aquifer of concern would be less than 20 feet at each of the areas under study.

Ref. No. 1

5. What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?

The soils in the western end of Vieques where the sites are located are represented by sandy clay, coarse sand and sandstone materials with small amounts of clay, with a permeability value of 10^{-5} to 10^{-7} cm/sec.

Ref. No. 1

6. What is the net precipitation for the area?

The net annual precipitation is approximately 4.5 inches.

Ref. No. 1

7. What is the distance to and depth of the nearest well that is currently used for drinking purposes?

The only registered drinking water well in this portion of the island is located in Colonia Puerto Real, outside the 4-mile study radius.

Ref. No. 3

8. If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be located within the contamination boundary of the release.

Presently, the Puerto Rico Aqueduct and Sewer Authority (PRASA) supplies water to Vieques through a pipeline from the mainland of Puerto Rico. However, in periods of high demand, groundwater can be used for potable supply, from aquifers located in the Valle de Esperanza and the Valle de Resolucion. These aquifers were the principal source of potable water for the island before the construction of the freshwater pipeline from Puerto Rico.

Ref. No. 2

9. **Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.**

Distance	Population
0-1/4 mi	0
>1/4-1/2 mi	0
>1/2-1 mi	0
>1-2 mi	0
>2-3 mi	0
>3-4 mi	0

The primary source of water is supplied from a freshwater pipeline from the mainland; the aquifer is exploited only in emergencies. There are no available records of the instances, volumes or distribution of emergency consumption.

Ref. No. 1,4

10. **Identify uses of groundwater within 4 miles of the site (i.e. private drinking source, municipal source, commercial, irrigation, unusable).**

A permanent spring located on the NAF-V property in the area south of Building 422 (near Site 3-IRFNA/MAF-4 Disposal Site) is used as a year-round source of water for cattle. During the drier months of the year, this permanent water source attracts large numbers of cattle from the range. The area is also used as a central location to herd cattle for range management.

Ref. No. 2

SURFACE WATER ROUTE

11. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence.**

There is a potential for a release of contaminants as the Mangrove Disposal Site is located in a marsh area. Wastes at the site were apparently piled up, burned, and then bulldozed into the mangrove area. The site is known to contain solvents and paint cans among other materials. Solvents used at the base included xylene, methyl ethyl ketone and toluene. Paints used at the base contained lead.

Site 3 is near to the probable surface recharge area for a permanent, naturally occurring spring. The spring is currently used by the Cooperative de Cos Ganaderos and is frequently used by cattle, horses, and various birds and other wildlife. However, it is located 2,000 feet downgradient of the drainage divide separating the spring's groundwater system from the groundwater system where fuel materials were disposed.

A spring/bog is located directly downhill from Site 3, Building 422, and is, therefore, in the same water -basin as the disposal area.

Ref. No. 1, 2, 11

12. Identify the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.

The nearest downslope surface waters are Laguna El Pobre and Laguna Kiani which are connected to Vieques Passage between the Atlantic Ocean and the Caribbean Sea.

Ref. No. 1

13. What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.

The Vieques Passage is the nearest downslope surface water for Sites 1 and 3. The distance the runoff from Site 1 would be expected to follow is approximately 2,500 feet, where the distance the runoff from Site 3 would be expected to follow is approximately 9,000 feet.

For Site 2, the nearest downslope surface water is Laguna El Pobre. The Mangrove Disposal Site is located partially in Laguna El Pobre; therefore, there is virtually no significant separation from surface water.

Ref. No. 1,2,4

14. Determine the floodplain that the site is located within.

Not Applicable

Ref. No. N/A

15. What is the 2-year 24-hour rainfall?

The 2-year, 24-hour rainfall was not available; however, the 1-year, 24-hour rainfall is approximately 18 inches.

Ref. No. 1

16. Identify drinking water intakes in surface waters within 15 miles downstream of the site. For each intake identify: the distance from the point of surface water entry, population served, and stream flow at the intake location.

Intake	Distance	Population Served	Flow (cfs)

There are no drinking water intakes in surface waters located within 15 miles downstream of any of the sites.

Ref. No. 1

17. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:

Fishery	Water Body Type	Flow (cfs)
Laguna Kiani	Lagoon	N/A
Laguna El Pobre	Lagoon	N/A
Vieques Passage	Ocean	N/A

Ref. No. 4 and 5

18. Identify sensitive environments that exist within 15 miles downstream of the point of surface water entry. For each sensitive environment specify the following:

Environment	Water Body Type	Flow (cfs)
Habitat known to be used by Federally designated or proposed endangered or threatened species	Coastal	N/A
Habitat known to be used by State designated endangered or threatened species	Coastal	N/A
Wetlands	Coastal	N/A

Ref. No. 1,4,7

19. If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 16-18 that are or may be located within the contamination boundary of the release.

Site 2-Mangrove Disposal Site is located in a coastal marsh, which is considered as a source of surface water. Therefore, Site 2 constitutes a suspected release to surface water. Because of

the proximity of the site, the sensitive environments and fisheries listed above would be located within the contamination boundary of the release.

Ref. No. 1 and 4

SOIL EXPOSURE PATHWAY

20. Determine the number of people that occupy residences or attend school or day care on or within 200 feet of the site property.

There are no residences, schools, or day care facilities located on or within 200 feet of any of the sites.

Ref. No. 1,4,5

21. Determine the number of people that work on or within 200 feet of the site property.

There are no workers who work on or within 200 feet of any of the sites.

Ref. No. 1,4,5

22. Identify terrestrial sensitive environments on or within 200 feet of the site property.

The Federal endangered and threatened species list does not presently include plants from Puerto Rico. However, the Commonwealth of Puerto Rico has published a committee report on rare and endangered flora. A comparison between the committee report and the species found at the sites has shown that 26 endangered and rare plants occur in the NAF-V area. However, the proximity of the species in relation to Sites 1, 2, and 3 is not certain.

Ref. No. 2

AIR ROUTE

23. Describe the likelihood of release of contaminants to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release define the supporting analytical evidence.

Wastes that were once disposed of on Sites 1, 2, and 3 have either been burned, bulldozed or piled. However, soils may still be contaminated with solvents, paints and a mixture of IRFNA and MAF-4, and could pose a potential problem if particulates become airborne during dry and dusty periods.

Ref. No. 1

24. Determine populations that reside within 4 miles of the site.

Distance	Population
0-1/4 mi	0
>1/4-1/2 mi	0
>1/2-1 mi	0
>1-2 mi	0
>2-3 mi	100
>3-4 mi	0

Ref. No. 4 and 6

25. Identify sensitive environments and wetlands acreage within 4 miles of the site.

Sensitive Environment Type	Distance
Habitat known to be used by Federally designated or proposed endangered or threatened species	Onsite
Habitat known to be used by State designated endangered or threatened species	Onsite
Wetlands	Onsite

The West Indian Whistling Duck (Dendrocygna arborea), which is located in the study area, is a Commonwealth listed threatened species and is a candidate for listing on the Federal threatened and endangered species list. The Commonwealth and Federally listed endangered West Indian Manatee (Trichechus manatus) breeds in ocean waters adjacent to the Mangrove Site. The endangered Hawksbill Turtle (Eretmochelys imbricata) and Leatherback Turtle (Dermochelis coriacea) have been observed in Vieques Passage along with the threatened Green Sea Turtle (Chelonia mydas); however, they are not inhabitants of the area.

Ref. No. 7 and 10

26. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination from the release.

A release to air has not been observed or is not suspected; therefore, the air migration pathway is not considered a threat to people who reside within the area of contamination. Additionally, it should be noted that the wind direction is toward the northwest, which is in the opposite direction from populated areas.

Ref. No. 1

27. **If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 25, that are or may be located within the area of air contamination precipitated from the release.**

A release to air has not been observed or is not suspected; therefore, the air migration pathway is not considered a threat to any sensitive environment located in the area of air contamination precipitated from the release.

Ref. No. 1

REFERENCES

1. Potential Hazardous Waste Site Preliminary Assessment. NUS Corp. Region 2 FIT. December 22, 1989.

2. Initial Assessment Study of Naval Station Roosevelt Roads, Puerto Rico. Greenleaf/Telesca, Planners, Engineers, Archetects, Inc. and Ecology and Environment, Inc. September, 1984.

3. Residential Well Information. Commonwealth of Puerto Rico, Department of Natural Resources. San Juan, Puerto Rico. July 17, 1992.

4. Geological Survey Topographic Map, 7.5 Minute Series, "Isla de Vieques, Puerto Rico" Quadrangle. U.S. Department of the Interior. 1951, Photo-revised 1982.

5. Site visit to Vieques Island

6. Telephone conversation , Roosevelt Roads Naval Station. October 1, 1992.

7. National Wetlands Inventory Map (Draft). U.S. Department of the Interior, Fish and Wildlife Service. October, 1985.

8. Confirmation Study to Determine Possible Dispersion and Migration of Specific Chemicals--U.S. Naval Station Roosevelt Roads, Puerto Rico, and U.S. Naval Ammunition Facility, Vieques. Environmental Science and Engineering, Inc. California. April, 1988.

9. Conversation with Winston Martinez, M.S., Soil Conservationist, Land Use Manager. Roosevelt Roads Naval Station. July 17, 1992.

10. Critical Coastal Wildlife Areas of Puerto Rico. Commonwealth of Puerto Rico, Department of Natural Resources. San Juan, Puerto Rico. September, 1988.

11. Site Summary for IRFNA/MAF-4 Disposal Site, Vieques Island (Site No. 3). Versar, Inc. Springfield, Virginia. February 4, 1991.

PA SCORESHEETS

OMB Approval Number: 2050-0095
Approved for Use Through: 1/92

PA-Score

PA Scoresheets

Site Name: NAVAL AMMUNITION FACILITY (NAF-V)
CERCLIS ID No.: NA
Street Address: UNKNOWN
City/State/Zip: VIEQUES, PR 000765

Investigator: SUSAN JOHNSTON
Agency/Organization: BAKER ENVIRONMENTAL, INC.
Street Address: 420 ROUSER ROAD
City/State: CORAOPOLIS, PA

Date: OCT. 1992

STE CHARACTERISTICS

Waste Characteristics (WC) Calculations:

1 QUEBRADA DISPOSAL Landfill Ref: 1 WQ value maximum

Volume 1.50E+03 cu yds 6.00E-01 6.00E-01
"It is estimated that there are over 1,500 cubic yards (500 feet x 20 feet x 4 feet) of material present at the site... etc."
"The assumption will be made that no more than one percent of the material is hazardous, based on the low level of industrial-type activity at NAF Vieques. One percent of 1,500 cubic yards is 15 cubic yards; using the figure of roughly 800 pounds per cubic yard for municipal garbage (Tchobanoglous et al., 1977), approximately 12,000 pounds or six tons of hazardous mateial may have been disposed of at this site."
Ref: 1

2 MANGROVE DISPOSAL Landfill Ref: 1 WQ value maximum

Volume 8.00E+02 cu yds 3.20E-01 3.20E-01
"The IAS team estimated that there are 800 cubic yards (100 feet x 75 feet x 3 feet) of materials at the site. The material was apparently piled up, burned, and then bulldozed into the mangrove area. This practice continued to 1978."
"Using the parameters mentioned above, as much as eight cubic yards of material weighing 6,400 pounds could be considered potentially hazardous."

Ref: 1

3 IRFNA/MAF-4 DISPOSAL Landfill Ref: 1 WQ value maximum

Constituent 7.05E+03 lbs 7.05E+03 7.05E+03
Twenty-five AQM-37As, target drones capable of supersonic speeds, were disposed of on and near the island of Vieques. The drones were found to be leaking fuel consisting of 71 pounds of mixed amine fuel (MAF-4) and 211 pounds of inhibited red fuming nitric acid (IRFNA) per drone. A maximum total of 1,775 pounds of MAF-4 and 5,275 pounds of IRFNA were emptied into the quebrada, and the drone bodies were disposed of by dropping them into the ocean off a deep water ledge.
Ref: 1

WQ total 7.05E+03

Waste Characteristics Score: WC = 32

Ground Water Pathway Criteria List
Suspected Release

Are sources poorly contained? (y/n/u)	Y
Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is precipitation heavy? (y/n/u)	Y
Is the infiltration rate high? (y/n/u)	N
Is the site located in an area of karst terrain? (y/n)	N
Is the subsurface highly permeable or conductive? (y/n/u)	N
Is drinking water drawn from a shallow aquifer? (y/n/u)	N
Are suspected contaminants highly mobile in ground water? (y/n/u)	U
Does analytical or circumstantial evidence suggest ground water contamination? (y/n/u)	Y
Other criteria? (y/n) N	
SUSPECTED RELEASE? (y/n)	Y

Summarize the rationale for Suspected Release:

The confirmation study data showed that metals concentrations in the ground water samples collected from Site 1 exceeded drinking water criteria and ambient water quality criteria in both the Round 1 and Round 2 investigations. It should be noted that the ground water was analyzed using an unfiltered sample versus a filtered sample.

Ground water was not sampled at Site 2.

Total zinc was the only constituent detected in the ground water sampled from a nearby existing well at Site 3. The detected level was below the National Secondary Drinking Water Standard.

Ref: 2

Ground Water Pathway Criteria List
Primary Targets

Is any drinking water well nearby? (y/n/u)	N
Has any nearby drinking water well been closed? (y/n/u)	N
Has any nearby drinking water well user reported foul-testing or foul-smelling water? (y/n/u)	N
Does any nearby well have a large drawdown/high production rate? (y/n/u)	N
Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance? (y/n/u)	N
Does analytical or circumstantial evidence suggest contamination at a drinking water well? (y/n/u)	N
Does any drinking water well warrant sampling? (y/n/u)	N

Other criteria? (y/n) N

PRIMARY TARGET(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Targets:

The term "nearby" generally includes any well within a 1/8 mile radius from the sites. Because no well exist within this distance, a primary target well was not identified.

Ref: 3

GROUND WATER PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do you suspect a release? (y/n)	Yes	
Is the site located in karst terrain? (y/n)	No	
Depth to aquifer (feet):	0	
Distance to the nearest drinking water well (feet):	0	

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0		
4. SECONDARY TARGET POPULATION Are any wells part of a blended system? (y/n) N	1	0	
5. NEAREST WELL	3	0	
6. WELLHEAD PROTECTION AREA None within 4 Miles	0	0	
7. RESOURCES	5	0	
T =	9	0	

WASTE CHARACTERISTICS

WC =	32	0

GROUND WATER PATHWAY SCORE: 2

Ground Water Target Populations

Primary Target Population Drinking Water Well ID	Dist. (miles)	Population Served	Reference	Value
None				
			Total	

Secondary Target Population Distance Categories	Population Served	Reference	Value
0 to 1/4 mile	0	4	0
Greater than 1/4 to 1/2 mile	0	4	0
Greater than 1/2 to 1 mile	0	4	0
Greater than 1 to 2 miles	0	4	0
Greater than 2 to 3 miles	100	4	1
Greater than 3 to 4 miles	0	4	0
		Total	1

Apportionment Documentation for a Blended System

Blended systems do not exist on Vieques Island.

Surface Water Pathway Criteria List
Suspected Release

Is surface water nearby? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is the drainage area large? (y/n/u)	N
Is rainfall heavy? (y/n/u)	Y
Is the infiltration rate low? (y/n/u)	Y
Are sources poorly contained or prone to runoff or flooding? (y/n/u)	Y
Is a runoff route well defined(e.g.ditch/channel to surf.water)? (y/n/u)	N
Is vegetation stressed along the probable runoff path? (y/n/u)	Y
Are sediments or water unnaturally discolored? (y/n/u)	N
Is wildlife unnaturally absent? (y/n/u)	N
Has deposition of waste into surface water been observed? (y/n/u)	N
Is ground water discharge to surface water likely? (y/n/u)	N
Does analytical/circumstantial evidence suggest S.W. contam? (y/n/u)	N

Other criteria? (y/n) N

SUSPECTED RELEASE? (y/n) Y

Summarize the rationale for Suspected Release:

Based on previously reported information, the wastes at Site 2 (Mangrove Disposal Site) were piled up, burned, and then bulldozed into the mangrove area. The Mangrove Disposal site is located in a coastal marsh, which is considered as a source of surface water. Therefore, Site 2 constitutes a suspected release to surface water.

Ref: 1

Surface Water Pathway Criteria List
Primary Targets

Is any target nearby? (y/n/u) If yes: Y
N Drinking water intake
Y Fishery
Y Sensitive environment

Has any intake, fishery, or recreational area been closed? (y/n/u) N

Does analytical or circumstantial evidence suggest surface water contamination at or downstream of a target? (y/n/u) N

Does any target warrant sampling? (y/n/u) If yes: Y
N Drinking water intake
Y Fishery
Y Sensitive environment

Other criteria? (y/n) N

PRIMARY INTAKE(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Intakes:

There have been no primary intakes identified in the study area. The Puerto Rico Aqueduct and Sewer Authority supplies water to Vieques through a pipeline from the mainland of Puerto Rico. Therefore, the primary intake has not been assigned a value.

Ref: 1
continued -------

continued -------

Other criteria? (y/n) Y

PRIMARY FISHERY(IES) IDENTIFIED? (y/n) Y

Summarize the rationale for Primary Fisheries:

It has been reported that the native population captures and consumes crabs within the study area. Therefore, the area would be considered a primary fishery.

Other criteria? (y/n) N

PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED? (y/n) Y

Summarize the rationale for Primary Sensitive Environments:

Site 2 is located in a Mangrove swamp, which is considered a sensitive environment. The National Wetlands Inventory Maps have identified Site 2 as an intertidal estuarine that is forested with broad-leaved evergreens and is regularly flooded.

Site 1 and 3 are identified as palustrine environments that are forested with broad-leaved evergreens and are temporarily flooded.

Ref: 5,6,7

SURFACE WATER PATHWAY SCORESHEETS

Pathway Characteristics		Ref.
Do you suspect a release? (y/n)	Yes	
Distance to surface water (feet):	50	6
Flood frequency (years):	1-10	
What is the downstream distance (miles) to:		
a. the nearest drinking water intake?	0.0	1
b. the nearest fishery?	0.2	1,6,7
c. the nearest sensitive environment?	0.1	5,6

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Drinking Water Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
3. Determine the water body type, flow (if applicable), and number of people served by each drinking water intake.			
4. PRIMARY TARGET POPULATION 0 person(s)	0		
5. SECONDARY TARGET POPULATION Are any intakes part of a blended system? (y/n): N	0	0	
6. NEAREST INTAKE	0	0	
7. RESOURCES	5	0	
T =	5	0	

Drinking Water Threat Target Populations

Intake Name	Primary (y/n)	Water Body Type/Flow	Population Served	Ref.	Value
None					

Total Primary Target Population Value	0
Total Secondary Target Population Value	0

Apportionment Documentation for a Blended System

Blended systems do not exist on Vieques Island.

Human Food Chain Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
8. Determine the water body type and flow for each fishery within the target limit.			
9. PRIMARY FISHERIES	300		
10. SECONDARY FISHERIES	0	0	
T =	300	0	

Human Food Chain Threat Targets

Fishery Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 LAGUNA KIANI	Y	primary fishery	1	300
2 LAGUNA EL POBRE	N	Coastal,ocean,Gr.Lake	6	12
3 LAGUNA ARENAS	N	Coastal,ocean,Gr.Lake	6	12
4 VIEQUES PASSAGE	N	Coastal,ocean,Gr.Lake	6	12
None				
		Total Primary Fisheries Value		300
		Total Secondary Fisheries Value		0

Environmental Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
11. Determine the water body type and flow (if applicable) for each sensitive environment.			
12. PRIMARY SENSITIVE ENVIRONMENTS	300		
13. SECONDARY SENSITIVE ENVIRONS.	0	0	
T =	300	0	

Environmental Threat Targets

Sensitive Environment Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 LAGUNA KIANI	Y	primary sens. envir.	7	300
2 LAGUNA EL POBRE	N	Coastal,ocean,Gr.Lake	6,7	300
3 LAGUNA ARENAS	N	Coastal,ocean,Gr.Lake	6,7	300

Total Primary Sensitive Environments Value	300
Total Secondary Sensitive Environments Value	0

rface Water Pathway Threat Scores

Threat	Likelihood of Release(LR) Score	Targets(T) Score	Pathway Waste Characteristics (WC) Score	Threat Score LR x T x WC / 82,500
Drinking Water	550	5	32	1
Human Food Chain	550	300	32	64
Environmental	550	300	32	60

SURFACE WATER PATHWAY SCORE: 100

Soil Exposure Pathway Criteria List
Resident Population

Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination? (y/n/u)	N
Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator? (y/n/u)	N
Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities? (y/n/u)	N
Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems? (y/n/u)	N
Does any neighboring property warrant sampling? (y/n/u)	N
Other criteria? (y/n)	N
RESIDENT POPULATION IDENTIFIED? (y/n)	N

Summarize the rationale for Resident Population:

The nearest residence is located approximately two miles from the center target area of the study area. Therefore, the resident population was not assigned a value.

Ref: 1,6,7

SOIL EXPOSURE PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do any people live on or within 200 ft of areas of suspected contamination? (y/n)	No	6,7
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination? (y/n)	No	6,7
Is the facility active? (y/n):	No	1

LIKELIHOOD OF EXPOSURE	Suspected Contamination	References
1. SUSPECTED CONTAMINATION LE =	550	

Targets

2. RESIDENT POPULATION 0 resident(s) 0 school/daycare student(s)	0	
3. RESIDENT INDIVIDUAL	0	
4. WORKERS None	0	
5. TERRES. SENSITIVE ENVIRONMENTS	0	
6. RESOURCES	0	
T =	0	

WASTE CHARACTERISTICS

WC = 32

RESIDENT POPULATION THREAT SCORE: 22

NEARBY POPULATION THREAT SCORE: 0

Population Within 1 Mile: None

SOIL EXPOSURE PATHWAY SCORE: 22

i.1 Exposure Pathway Terrestrial Sensitive Environments

	Terrestrial Sensitive Environment Name	Reference	Value
1	LAGUNA KIANI	1,6	50
2	LAGUNA EL POBRE	1,6	50
	Total Terrestrial Sensitive Environments Value		100

Air Pathway Criteria List
Suspected Release

Are odors currently reported? (y/n/u)	N
Has release of a hazardous substance to the air been directly observed? (y/n/u)	N
Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air? (y/n/u)	N
Does analytical/circumstantial evidence suggest release to air? (y/n/u)	N
Other criteria? (y/n)	N
SUSPECTED RELEASE? (y/n)	N

Summarize the rationale for Suspected Release:

Currently, there have not been any odors reported or releases that have been directly observed at Sites 1, 2, or 3. Therefore, the air migration pathway will not be assigned a value.

The direction of the wind is toward the northwest, which is in the opposite direction from populated areas.

Ref: 1

AIR PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do you suspect a release? (y/n)	No	
Distance to the nearest individual (feet):	10560	6,7

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0		
2. NO SUSPECTED RELEASE		500	
LR =	0	500	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0		
4. SECONDARY TARGET POPULATION	0	0	
5. NEAREST INDIVIDUAL	0	0	
6. PRIMARY SENSITIVE ENVIRONS.	0		
7. SECONDARY SENSITIVE ENVIRONS.	0	16	
8. RESOURCES	0	5	
T =	0	21	

WASTE CHARACTERISTICS

WC =	0	32

AIR PATHWAY SCORE:	4

Pathway Secondary Target Populations

Distance Categories	Population	References	Value
Onsite	0	4	0
Greater than 0 to 1/4 mile	0	4	0
Greater than 1/4 to 1/2 mile	0	4	0
Greater than 1/2 to 1 mile	0	4	0
Greater than 1 to 2 miles	0	4	0
Greater than 2 to 3 miles	100	4	0
Greater than 3 to 4 miles	0	4	0
		Total Secondary Population Value	0

Pathway Primary Sensitive Environments

Sensitive Environment Name	Reference	Value
None		
Total Primary Sensitive Environments Value		

Air Pathway Secondary Sensitive Environments

Sensitive Environment Name	Distance	Reference	Value
1 LAGUNA KIANI	onsite	1,6,7	7.5
2 LAGUNA KIANI	onsite	1,6,7	5.0
3 LAGUNA EL POBRE	0 - 1/4	1,6,7	3.1
Total Secondary Sensitive Environments Value			16

SITE SCORE CALCULATION	SCORE
GROUND WATER PATHWAY SCORE:	2
SURFACE WATER PATHWAY SCORE:	100
SOIL EXPOSURE PATHWAY SCORE:	22
AIR PATHWAY SCORE:	4
SITE SCORE:	51

MMARY

1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water? No

   If yes, identify the well(s).

   If yes, how many people are served by the threatened well(s)? 0

2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?
   A. Drinking water intake — No
   B. Fishery — Yes
   C. Sensitive environment (wetland, critical habitat, others) — Yes

   If yes, identity the target(s).
   Fishery: Laguna El Pobre
   Laguna Arenas
   Vieques Passage
   Sensitive Environments: Laguna Kiani
   Laguna El Pobre
   Laguna Arenas

3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility? No

   If yes, identify the properties and estimate the associated population(s)

4. Are there public health concerns at this site that are not addressed by PA scoring considerations? No

   If yes, explain:

REFERENCE LIST

1. INITIAL ASSESSMENT STUDY OF NAVAL STATION ROOSEVELT ROADS, PUERTO RICO. GREENLEAF/TELESCA, PLANNERS.ENGINEERS.ARCHITECTS, INC. AND ECOLOGY AND ENVIRONMENT, INC. SEPTEMBER, 1984.

2. CONFIRMATION STUDY TO DETERMINE POSSIBLE DISPERSION AND MIGRATION OF SPECIFIC CHEMICALS...U.S.NAVAL AMMUNITION FACILITY, VIEQUES. ENVIRONMENTAL SCIENCE AND ENGINEERING, INC. CALIFORNIA. APRIL, 1988.

3. RECONNAISSANCE OF THE GROUND-WATER RESOURCES OF VIEQUES ISLAND, PUERTO RICO. U.S. GEOLOGICAL SURVEY: WATER-RESOURCES INVESTIGATIONS REPORT. SAN JUAN, PUERTO RICO. 1986.

4. PERSONAL COMMUNICATION WITH ROOSEVELT ROADS. OCTOBER 1, 1992.

5. NATIONAL WETLANDS INVENTORY MAP (DRAFT). U.S DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE. OCTOBER, 1985.

6. GEOLOGICAL SURVEY TOPOGRAPHIC MAP, 7.5 MINUTE SERIES, "ISLA DE VIEQUES PUERTO RICO" QUADRANGLE. U.S DEPARTMENT OF THE INTERIOR. 1951, PHOTOREVISED 1982.

7. SITE VISIT TO VIEQUES ISLAND.